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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/622,089	08/10/2000	Hiroki Nomoto	490042-87GS0	6664

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MINNEAPOLIS, MN 55402

EXAMINER

DOROSHENK, ALEXA A

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 06/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/622,089

Applicant(s)

NOMOTO ET AL.

Examiner

Alexa A. Doroshenk

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-11, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moss (4,517,162).

It is noted that the claims do not contain a transition phrase. MPEP 2111.03. For purposes of examination, the claims have been interpreted to be of open claim language.

With respect to claims 1 and 3, Moss discloses a fluidized bed reactor (10) comprising:

gas injecting nozzles (17 and 47) provided on a gas distributor in a lower portion of the reactor (see fig. 1);

partitions (11 and 14) which form compartments (16 and 41) in the bed;

a connecting hole (19 and 24) in the lower ¼ of the fluidized bed (see fig. 1); and

a slope (20, 25) which is greater than the angle of repose of the bed of particles (col. 6, lines 14-17).

Though Moss does not disclose the size of the connecting whole or the distance of the gas injecting nozzles from the connecting whole nor any particular sizes for any portion of the device, it is held that one of ordinary skill in the art would have found it *prima facie* obvious to arrive at an optimum or workable range of the size of a

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connecting hole as well as the connecting whole to nozzle distance by mere routine experimentation. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) (“[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.”).

Additionally, change in size and shape is not patently distinct over the prior art absent persuasive evidence that the particular configuration of the claimed invention is significant. See *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

With respect to claim 2, it can be seen in figure 1 that a lower portion (20, 25) of the connecting hole is positioned above a gas injection nozzle (17, 47).

With respect to claims 4, 9, and 11, it can be seen in figure 1 that a lower surface portion (20, 25) of the connecting hole protrudes from both ends of the partition plate (11, 14).

With respect to claims 5 and 10, it can be seen in figure 1 that the upper surface of the protruding portion (20, 25) is obliquely cut.

With respect to claims 6, 7 and 15, it can be seen in figure 1 that the connecting hole (19, 24) and its protruding portion (20, 25) are slanted downward from the upstream side toward the downstream side.

With respect to claims 8 and 16, it can be seen in figure 1 that an angle of slant is greater than an angle of repose of the material.

3. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moss (4,517,162) as applied to claim 1 above, and further in view of Butt (EP 0 144 172 A2).

Moss discloses the apparatus as discussed with respect to claim 1 above, but does not disclose wherein an injecting nozzle is provided in the middle of the connecting hole.

Butt teaches a similar compartmentalized fluidized bed device wherein a gas injection nozzle (52, 54) is positioned in the middle of the connecting hole of a partition (4) (see fig. 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a gas injection nozzle in the middle of the connecting hole of a partition plate of Moss in the manner taught by Butt in order to provide improved fluidization and movement of the fluidized bed from compartment to compartment.

4. Claim 13 rejected under 35 U.S.C. 103(a) as being unpatentable over Moss (4,517,162) in view of Butt (EP 0 144 172 A2) as applied to claim 12 above, and further in view of Voegeli (3,978,176).

The apparatus of Moss in view of Butt does not disclose the specific type of sparger/gas injection nozzle used.

Voegeli discloses a sparger made up of a porous material which can be used in a fluidized bed apparatus (col. 2, lines 5-27). It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the particular

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sparger of Voegeli in the modified device of Moss as it is merely the selection of sparger/gas injection nozzles known to be effective in the art.

5. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moss (4,517,162) in view of Butt (EP 0 144 172 A2) as applied to claim 12 above, and further in view of Wietzke et al (6,029,612).

The apparatus of Moss in view of Butt does not disclose wherein the nozzle is obliquely bent from the upstream side toward the downstream side.

Wietzke et al. teaches a gas injection nozzle (42, 44) in the partition (41) of a fluidized bed wherein the nozzle is obliquely bent from the upstream side toward the downstream side in order to provide a solid flow seal and prevent particles from flowing into the nozzle (col. 6, lines 6-36). It would have been obvious to one of ordinary skill in the art at the time the invention was made provide an oblique bend from the upstream side toward the downstream side of the connecting hole of Moss in order to gain the advantages of a solid flow seal as taught by Wietzkie et al.

6. Claims 17-27, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moss (4,517,162) in view of Asai et al. (4,460,330).

It is noted that the claims do not contain a tradition transitional phrase. MPEP 2111.03. For purposes of examination, the claims have been interpreted to be of open claim language.

With respect to claims 17 and 19, Moss discloses a fluidized bed reactor (10) comprising:

gas injecting nozzles (17 and 47) provided on a gas distributor in a lower portion of the reactor (see fig. 1);

partitions (11 and 14) which form compartments (16 and 41) in the bed;

a connecting hole (19 and 24) in the lower $\frac{1}{4}$ of the fluidized bed (see fig. 1); and

a slope (20, 25) which is greater than the angle of repose of the bed of particles (col. 6, lines 14-17).

Though Moss does not disclose the size of the connecting whole or the distance of the gas injecting nozzles from the connecting whole nor any particular sizes for any portion of the device, it is held that one of ordinary skill in the art would have found it *prima facie* obvious to arrive at an optimum or workable range of the size of a connecting hole as well as the connecting whole to nozzle distance by mere routine experimentation. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) (“[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.”).

Additionally, change in size and shape is not patently distinct over the prior art absent persuasive evidence that the particular configuration of the claimed invention is significant. See *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

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Moss discloses wherein the fluidizing bed apparatus uses "suitable holes or nozzles" but fails to disclose an example wherein the nozzles inject horizontally.

Asai et al. also teaches a fluidized bed device wherein the distribution nozzles inject gas horizontally into the bed (see figure 4) and that this design allows for higher temperatures to be reached in the bed and better mixing (col. 1, lines 27-60). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the nozzles of Asai et al. for the nozzles of Moss since they are "suitable" for fluidized bed use and in order to achieve the advantages taught by Asai et al.

With respect to claim 18, it can be seen in figure 1 that a lower portion (20, 25) of the connecting hole is positioned above a gas injection nozzle (17, 47).

With respect to claims 20, 25, and 27, it can be seen in figure 1 that a lower surface portion (20, 25) of the connecting hole protrudes from both ends of the partition plate (11, 14).

With respect to claims 21 and 26, it can be seen in figure 1 that the upper surface of the protruding portion (20, 25) is obliquely cut.

With respect to claims 22, 23 and 31, it can be seen in figure 1 that the connecting hole (19, 24) and its protruding portion (20, 25) are slanted downward from the upstream side toward the downstream side.

With respect to claims 24 and 32, it can be seen in figure 1 that an angle of slant is greater than an angle of repose of the material.

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7. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moss (4,517,162) in view of Asai et al. (4,460,330) as applied to claim 17 above, and further in view of Butt (EP 0 144 172 A2).

The modified apparatus of Moss discloses the apparatus as discussed with respect to claim 17 above, but does not disclose wherein an injecting nozzle is provided in the middle of the connecting hole.

Butt teaches a similar compartmentalized fluidized bed device wherein a gas injection nozzle (52, 54) is positioned in the middle of the connecting hole of a partition (4) (see fig. 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a gas injection nozzle in the middle of the connecting hole of a partition plate of Moss in the manner taught by Butt in order to provide improved fluidization and movement of the fluidized bed from compartment to compartment.

8. Claim 29 rejected under 35 U.S.C. 103(a) as being unpatentable over Moss (4,517,162) in view of Asai et al. (4,460,330) and Butt (EP 0 144 172 A2) as applied to claim 28 above, and further in view of Voegeli (3,978,176).

The modified apparatus of does not disclose the specific type of sparger/gas injection nozzle used.

Voegeli discloses a sparger made up of a porous material which can be used in a fluidized bed apparatus (col. 2, lines 5-27). It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the particular

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sparger of Voegeli in the modified device of Moss as it is merely the selection of sparger/gas injection nozzles known to be effective in the art.

9. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moss (4,517,162) in view of Asai et al. (4,460,330) and Butt (EP 0 144 172 A2) as applied to claim 28 above, and further in view of Wietzke et al (6,029,612).

The modified apparatus of Moss does not disclose wherein the nozzle is obliquely bent from the upstream side toward the downstream side.

Wietzke et al. teaches a gas injection nozzle (42, 44) in the partition (41) of a fluidized bed wherein the nozzle is obliquely bent from the upstream side toward the downstream side in order to provide a solid flow seal and prevent particles from flowing into the nozzle (col. 6, lines 6-36). It would have been obvious to one of ordinary skill in the art at the time the invention was made provide an oblique bend from the upstream side toward the downstream side of the connecting hole of Moss in order to gain the advantages of a solid flow seal as taught by Wietzkie et al.

10. Claims 33-43, 47 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moss (4,517,162) in view of DeFeo et al. (4,378,744).

It is noted that the claims do not contain a tradition transitional phrase. MPEP 2111.03. For purposes of examination, the claims have been interpreted to be of open claim language.

With respect to claims 33 and 35, Moss discloses a fluidized bed reactor (10) comprising:

gas injecting nozzles (17 and 47) provided on a gas distributor in a lower portion of the reactor (see fig. 1);

partitions (11 and 14) which form compartments (16 and 41) in the bed;

a connecting hole (19 and 24) in the lower $\frac{1}{4}$ of the fluidized bed (see fig. 1); and

a slope (20, 25) which is greater than the angle of repose of the bed of particles (col. 6, lines 14-17).

Though Moss does not disclose the size of the connecting whole or the distance of the gas injecting nozzles from the connecting whole nor any particular sizes for any portion of the device, it is held that one of ordinary skill in the art would have found it *prima facie* obvious to arrive at an optimum or workable range of the size of a connecting hole as well as the connecting whole to nozzle distance by mere routine experimentation. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) (“[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.”).

Additionally, change in size and shape is not patently distinct over the prior art absent persuasive evidence that the particular configuration of the claimed invention is significant. See *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Moss discloses wherein the fluidizing bed apparatus uses "suitable holes or nozzles" but fails to disclose an example wherein the nozzles inject horizontally.

DeFeo et al. also teaches a fluidized bed device wherein the distribution nozzles inject gas obliquely downward (102, 156) into the bed (see figures 4 and 5) and that this design allows for higher temperatures to be reached in the bed and more accurate positioning in the bed (col. 2, lines 53-62). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the nozzles of DeFeo et al. for the nozzles of Moss since they are "suitable" for fluidized bed use and in order to achieve the advantages taught by DeFeo et al.

With respect to claim 34, it can be seen in figure 1 that a lower portion (20, 25) of the connecting hole is positioned above a gas injection nozzle (17, 47).

With respect to claims 36, 41, and 43, it can be seen in figure 1 that a lower surface portion (20, 25) of the connecting hole protrudes from both ends of the partition plate (11, 14).

With respect to claims 37 and 42, it can be seen in figure 1 that the upper surface of the protruding portion (20, 25) is obliquely cut.

With respect to claims 38, 39 and 47, it can be seen in figure 1 that the connecting hole (19, 24) and its protruding portion (20, 25) are slanted downward from the upstream side toward the downstream side.

With respect to claims 40 and 48, it can be seen in figure 1 that an angle of slant is greater than an angle of repose of the material.

11. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moss (4,517,162) in view of DeFeo et al. (4,378,744) as applied to claim 33 above, and further in view of Butt (EP 0 144 172 A2).

The modified apparatus of Moss discloses the apparatus as discussed with respect to claim 33 above, but does not disclose wherein an injecting nozzle is provided in the middle of the connecting hole.

Butt teaches a similar compartmentalized fluidized bed device wherein a gas injection nozzle (52, 54) is positioned in the middle of the connecting hole of a partition (4) (see fig. 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a gas injection nozzle in the middle of the connecting hole of a partition plate of Moss in the manner taught by Butt in order to provide improved fluidization and movement of the fluidized bed from compartment to compartment.

12. Claim 45 rejected under 35 U.S.C. 103(a) as being unpatentable over Moss (4,517,162) in view of DeFeo et al. (4,378,744) and Butt (EP 0 144 172 A2) as applied to claim 44 above, and further in view of Voegeli (3,978,176).

The modified apparatus of Moss does not disclose the specific type of sparger/gas injection nozzle used.

Voegeli discloses a sparger made up of a porous material which can be used in a fluidized bed apparatus (col. 2, lines 5-27). It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the particular

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sparger of Voegeli in the modified device of Moss as it is merely the selection of sparger/gas injection nozzles known to be effective in the art.

13. Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moss (4,517,162) in view of DeFeo et al. (4,378,744) and Butt (EP 0 144 172 A2) as applied to claim 44 above, and further in view of Wietzke et al (6,029,612).

The modified apparatus of Moss does not disclose wherein the nozzle is obliquely bent from the upstream side toward the downstream side. Wietzke et al. teaches a gas injection nozzle (42, 44) in the partition (41) of a fluidized bed wherein the nozzle is obliquely bent from the upstream side toward the downstream side in order to provide a solid flow seal and prevent particles from flowing into the nozzle (col. 6, lines 6-36). It would have been obvious to one of ordinary skill in the art at the time the invention was made provide an oblique bend from the upstream side toward the downstream side of the connecting hole of Moss in order to gain the advantages of a solid flow seal as taught by Wietzkie et al.

Response to Amendment

35 USC 112, First Paragraph

The rejection of claims 1-16 under 35 USC 112, first paragraph is withdrawn due to applicant's amendments to the claims.

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Drawings

The objection to the drawings is withdrawn due to applicant's amendments to the claims.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexa A. Doroshenk whose telephone number is 571-272-1446. The examiner can normally be reached on Monday - Thursday from 9:00 AM - 7:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Alexa A. Doroshenk
Examiner
Art Unit 1764

June 23, 2005


ALEXA DOROSHENK
PRIMARY EXAMINER